TRANSMITTAL OF APPEAL BRIEF (Large Entity)	Docket No. **ITL.0561US**

In Re Application Of: **Michael Kozhukh**

Serial No.	Filing Date	Examiner	Group Art Unit
09/842,935	**April 26, 2001**	**Audrey Chang**	**2872**

Invention: **Highly Reflective Optical Components**

TO THE ASSISTANT COMMISSIONER FOR PATENTS:

Transmitted herewith in triplicate is the Appeal Brief in this application, with respect to the Notice of Appeal filed on **December 3, 2002.**

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Dated: **January 3, 2003**

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#9 Appeal Brief
JAN 1-2003

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Applicant:	Michael Kozhukh	Art Unit:	2872
Serial No.:	09/842,935		
Filed:	April 26, 2001	Examiner:	Audrey Chang
For:	Highly Reflective Optical Components	Atty Docket:	ITL.0561US P11332

Board of Patent Appeals & Interferences
Commissioner for Patents
Washington, D.C. 20231

APPEAL BRIEF

Sir:

Applicant respectfully appeals from the final rejection mailed September 18, 2002.

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I. REAL PARTY IN INTEREST

The real party in interest is the assignee Intel Corporation.

II. RELATED APPEALS AND INTERFERENCES

None.

III. STATUS OF THE CLAIMS

Claims 1-6, 8-13, and 16-30 are rejected. Each rejection is appealed.

1-10-02 P. Brister

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Date of Deposit: January 3, 2003
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Cynthia L. Hayden

IV. STATUS OF AMENDMENTS

All amendments were entered.

V. SUMMARY OF THE INVENTION

Referring to Figure 1, a silicon wafer or other substrate 16 may be coated with a layer 14 of silver, a layer 12 of silicon dioxide and a layer 10 of silicon nitride. The layer 14 provides high reflectivity. The layers 10 and 12 may provide isolation from liquid crystal materials in those applications where it is desired to separate the reflective material from a liquid crystal material.

The silver layer 14 may be deposited by direct current or dc-sputtering on the surface of a polished silicon wafer at a substrate temperature not higher than 50°C. In the illustrated embodiment, pure silver is utilized for the layer 14. While generally the use of silver is avoided in semiconductor processes, the deleterious effect of silver on silicon may be substantially lessened by depositing the silver at low temperature.

In one embodiment, each of the layers 10 and 12 may have a thickness of about 700 to about 750 Angstroms. Advantageously, the layers 10 and 12 are deposited using chemical vapor deposition techniques at temperatures not higher than 250°C. The use of relatively low temperature deposition techniques (normal deposition techniques may involve temperatures of 400°C) may be effective to form layers with relatively small grain sizes.

In Figure 2, the layers 10 and 12 of Figure 1 are replaced by a thicker layer 16 of silicon dioxide. The layer 16 in Figure 2 can be formed of a thickness of approximately 3000 Angstroms using chemical vapor deposition techniques and temperatures not higher than 250°C in one embodiment. See specification at page 2, line 24 through page 4, line 2.

The inventor of the present invention has determined that the use of silver as a reflector is highly advantageous compared to the use of aluminum and particularly to the use of aluminum plus 0.5% copper. The use of aluminum plus copper has been credited with achieving the highest commercially available reflectivities on the order of ninety percent. As shown in Figure 3, a significant reflectivity improvement, on a percentage basis, can be achieved using silver compared to aluminum plus copper.

Referring next to Figure 4, as would be expected, coating the silver films with silicon dioxide or silicon dioxide plus silicon nitride, decreases the reflectivity of the resulting composite. However, this may be necessary in some applications involving liquid crystal materials. What is more interesting though is the blue shift that occurs when using silver covered by 750 Angstroms of silicon dioxide and 750 Angstroms of silicon nitride.

The peculiar drop in the reflectivity of blue light is particularly noticeable compared to the results for silver covered by 3000 Angstroms of silicon dioxide. Clearly, the inclusion of silicon nitride in the overcoating has a dramatic (negative) effect on the reflection of blue light. In addition, the use of two relatively thin insulator layers with relatively small grain sizes may contribute to the blue shift.

Reducing the reflection of blue light, in particular, from a reflective surface may be advantageous in many applications. For example, many lamps utilized in connection with projection displays over produce blue light relative to other visible light wavelengths. In other words, the light produced has a spectra that includes more blue light than normal ambient light. This imbalance may be corrected by using a reflector that produces a blue shift. The result of using a reflector including a coating of silicon nitride may be to reduce the amount of reflected

blue light and to thereby automatically rebalance the spectra of the lamp or light source. See specification at page 4, line 3 through page 5, line 14.

VI. ISSUES

A. Are Claims 1 and 8 Indefinite Because They Use the Word About?

B. Is the Section 112 Rejection of Claim 4 Proper?

C. Is Claim 1 Obvious Over Li By Itself?

D. Is Claim 16 Obvious Over Jerman By Itself?

E. Is Claim 25 Obvious Over Jerman By Itself?

VII. GROUPING OF THE CLAIMS

For convenience on appeal:

Claims 1-6 and 8-13 may be grouped for prior art rejection analysis as set forth in Section C below;

Claims 16-24 may be grouped as set forth in Section D below; and

Claims 25-30 may be grouped as discussed in Section E below.

VIII. ARGUMENT

A. Are claims 1 and 8 Indefinite Because They Use the Word About?

The use of the word "about" in claims 1 and 8 has been objected to as indefinite. However, the use of "about" in this circumstance is explicitly permitted by M.P.E.P. Section 2173.05(b)(A).

Therefore, the rejection should be reversed.

B. Is the Section 112 Rejection of Claim 4 Proper?

Claim 4 calls for a silver layer covered by an insulator. The claim was objected to as indefinite because of the use of the phrase "covered by an insulator."

Claim 1 makes it clear that the absorbing layer is over the reflective layer and claim 4 makes it clear that the reflective layer formed of silver is covered by an insulator. It does not matter, according to the claim, what the relative positions are of the insulator and the absorbing layer. The claim is broad enough to cover any combination of stacks of such materials.

The claim cannot be indefinite just because it is broad. There is nothing indefinite about simply stating what the relative positions of the various elements are and leaving the restrictions out without respect to other elements. Persons skilled in the art can determine whether they infringe by determining whether they have the layers and whether the layers are in the relative orientations claimed.

Therefore, the rejection of claim 4 should be reversed.

C. Is Claim 1 Obvious Over Li By Itself?

Claim 1 calls for an absorbing layer over a reflective layer. The absorbing layer includes about 700 to about 750 Angstroms of silicon dioxide and about 700 to about 750 Angstroms of silicon nitride. As explained in the specification (page 4, line 13 through page 5, line 2) and as shown in Figure 4, such an absorbing layer causes a blue shift. The claimed reflector has a dramatic negative effect on the reflection of blue light.

One application for embodiments of the present invention is in connection with projection displays where the light source over-produces blue light. If such light is reflected by

the claimed reflector the over-produced blue component is moderated (See specification at page 5, lines 3-14).

With respect to the Examiner's arguments in paragraph 10 of the final rejection that technology may be deduced scientifically, if this were the law, all the Examiner would need do is cite this paragraph in every single office action and nothing would be patentable. Of course, all kinds of basic principles are known, but none of these principles are applied in any of the cited references in the way set forth in the claim.

Contrary to the Examiner's assertion, at the claimed thickness, a dramatic effect on the reflection of blue light is produced. Thus, while the claim does not say anything about blue light, the claim does give the characteristics that cause this effect. Therefore, the Examiner cannot on one hand simply ignore the limitations to the claimed size ranges and on the other hand ignore the effect those size ranges have on the operation of the device.

Effectively, the Examiner is saying that the claimed size range is of no patentable significance despite the fact that it has significant functional effects. Moreover, these effects are nowhere shown in the art. Thus, it is entirely inconsistent to simply say that the claimed range is merely a matter of choice and to ignore the effect that range has on the resulting characteristics, especially when those characteristics are not possessed by the prior art.

The Examiner's assertions of well known art in the Advisory Action are untimely and are hereby challenged. Moreover, the Examiner's argument is incorrect since Li uses approximately from about 400 to 1000 millimeter oxide coatings for his blue filter. See Li, Table II. Li's coatings do not use nitride and oxide and Li's coating thicknesses are all much different than those claimed. Although Li never even attempts to create a blue shift, Li's much higher, all oxide coatings, would most correspond to the silver plus 3000A SiO_2 curve in Figure 4 of the

present application, which does not exhibit the blue shift possessed by the claimed structure (Ag + 750°A SiO_2 + 750°A Si_3N_4). Therefore, the Examiner's suppositions are baseless and the assertion that Li teaches the same materials is untrue. Finally, the argument that Li implicitly teaches the same thicknesses or even the same order is plainly wrong as demonstrated by Table II in Li.

Therefore, the rejection of claim 1 should be reversed.

D. Is Claim 16 Obvious Over Jerman By Itself?

Claim 16 calls for a silver layer formed directly on a silicon substrate. The deposition of silver on silicon is avoided in the prior art semiconductor processes because of silver's deleterious effects as a silicon contaminant. (See specification at page 3, lines 7-14). However, the applicant has determined that these effects can be overcome. In one embodiment, the silver can be deposited at a sufficiently low temperature to reduce substrate contamination.

With respect to claim 16, the Examiner refused to provide substantiation for the Examiner's own subjective beliefs as to what would be obvious. Thus, this refusal to substantiate the rejection results in the failure to make out a *prima facie* rejection. See M.P.E.P. 2143. The Examiner contends that claim 16 does not recite "the silver layer is directly on the silicon substrate." The Examiner is mistaken since claim 16 cites "a silver layer formed directly on said silicon substrate." Plainly the Examiner's position here is untenable and it should be reversed.

The Examiner baselessly asserts in the Advisory Action that the claimed invention, no where suggested in the art, is a matter of choice. However, such arguments are statutorily irrelevant and are aimed solely at obscuring the total absence of objective evidence of

obviousness. Failing to present a *prima facie* rejection as required by the rules, the Examiner put the shoe on the wrong foot in insisting that the Applicant prove non-obviousness. The argument that the specification must support novelty is non-statutory and legally unsupportable.

In addition, the Examiner's reliance on Grupp in paragraph 12 of the final rejection is not understood. None of the rejections in any way make use of Grupp or substantiate any reason to modify any element in the other reference to reach the claimed invention. Since the rejection is not based on Grupp, the discussion of Grupp is of no significance.

E. Is Claim 25 Obvious Over Jerman By Itself?

Claim 25 calls for forming a silver layer over silicon at a temperature of less than 50°C. As explained above, this low temperature fabrication technique reduces the deleterious effects that would occur when silver is directly deposited on a silicon substrate.

As discussed above, the deposition of silver on a silicon substrate is not taught. Moreover, such a low temperature technique is also not taught.

IX. CONCLUSION

Applicant respectfully requests that each of the final rejections be reversed and that the claims subject to this Appeal be allowed to issue.

Respectfully submitted,

Date: 1/3/03

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APPENDIX OF CLAIMS

The claims on appeal are:

1. A reflector comprising:

a reflective layer; and

an absorbing layer that preferentially absorbs blue light, said absorbing layer being located over said reflective layer, said absorbing layer including about 700 to about 750 Angstroms of silicon dioxide and about 700 to about 750 Angstroms of silicon nitride.

2. The reflector of claim 1 wherein said reflector is a micromirror.

3. The reflector of claim 1 wherein said reflective layer is formed of silver, said silver being formed over a polished semiconductor material.

4. The reflector of claim 3 wherein said silver layer is covered by an insulator.

5. The reflector of claim 3 wherein the absorbing layer includes silicon nitride.

6. The reflector of claim 4 wherein said absorbing layer includes silicon dioxide.

8. A method comprising:

forming a reflective layer; and

forming an absorbing layer, including oxide and nitride layers of a thickness of about 700 to about 750 Angstroms over said reflective layer, that absorbs a particular wavelength of light.

9. The method of claim 8 including forming a reflective layer by depositing silver on a semiconductor layer.

10. The method of claim 8 including forming an absorbing layer including a layer of two different insulator materials.

11. The method of claim 9 including forming said silver layer at a temperature of 50°C or less.

12. The method of claim 10 including forming said absorbing layer at a temperature of less than 250°C.

13. The method of claim 12 including forming said absorbing layer using chemical vapor deposition.

16. A reflector comprising:

a silicon substrate; and

a silver layer formed directly on said silicon substrate.

17. The reflector of claim 16 wherein said reflector is a micromirror.

18. The reflector of claim 16 including an absorbing layer over said silver layer.

19. The reflector of claim 18 wherein said absorbing layer preferentially absorbs blue light.

20. The reflector of claim 18 wherein said absorbing layer includes silicon nitride.

21. The reflector of claim 20 wherein said absorbing layer includes silicon dioxide.

22. The reflector of claim 21 wherein said insulator includes about 700 to 750 Angstroms of silicon dioxide and from about 700 to about 750 Angstroms of silicon nitride.

23. The reflector of claim 16 wherein said silver layer is formed at a temperature below 50°C.

24. The reflector of claim 18 wherein said absorbing layer is formed at a temperature below 250°C.

25. A method comprising:

depositing silver on a silicon substrate at a temperature less than 50°C; and

forming an absorbing layer over said silver.

26. The method of claim 25 including forming an absorbing layer including a layer of two different insulator materials.

27. The method of claim 26 including forming said absorbing layer at a temperature of less than 250°C.

28. The method of claim 26 including forming said absorbing layer of a layer of oxide and a layer of nitride.

29. The method of claim 28 including forming said oxide and nitride layers of a thickness of about 700 to about 750 Angstroms.

30. The method of claim 29 including depositing said oxide and nitride layers using chemical vapor deposition.